

FIELD ARTILLERY PIECE CIRCA 1812

# GUNS OF FORT DEFIANCE

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## FOR:

**APPLE II®**, 48K APPLESOFT Cassette, 48K Diskette  
**TRS-80®**, Level II 16K Cassette, 32K Diskette  
**PET 2001®**, 16K Cassette  
**ATARI 800®**, 40K Cassette

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## INTRODUCTION

Fort Defiance is a half-finished stockade blocking the path of an invading army during the War of 1812. You are the commander of an artillery piece defending the fort against an enemy that heavily outnumbers your garrison. Your skill and determination in repelling the assault will determine the fate of the fort.

Your gun is stationed on an incomplete side of the fort. Fortunately, you have an ample supply of ammunition and the attackers will have to cross over hundreds of yards of open ground. The enemy may attack with cavalry, infantry, or artillery . . . but the narrow trail they must follow to reach the starting position for each attack . . . limits them to attacking with only one infantry, cavalry company, or howitzer at a time.

From your position in the watchtower you see the enemy far off in the distance, organizing for an assault. You see them coming and briskly bark orders to your gunners!

## ABOUT THE HANDICAP

Before each game begins, the computer will ask you for a handicap. You can choose any number from 1 to 64 (63 on the Apple). The computer suggests a handicap for your first game. The higher the number is, the longer the enemy will keep coming before breaking into a retreat. For instance, if you choose a handicap of 1, the attackers will probably break and rout after only one casualty.

## HOW TO PLAY

As your gunners go through the steps of loading the cannon for each shot, you will have to give them appropriate orders. You are responsible for selecting the specific type of ammunition, specifying the fuse length (when needed), determining the elevation setting and pin-pointing a target.

## AMMUNITION SELECTION

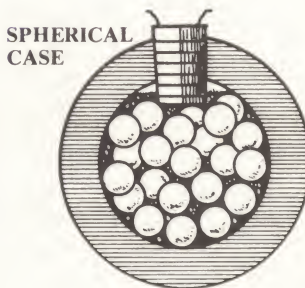
You have five types of ammunition from which to choose: Ball, Cannister, Double Cannister, Shell and Spherical Case. At the beginning of each game the display in the lower right hand corner of the fort lists the number of rounds available for each type. This display also keeps a running tab on how many rounds are left of each type throughout the game.

The computer will ask you which ammunition you want to use. Enter your selection by typing:

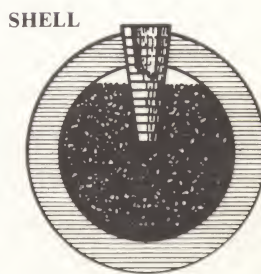
**B** for Ball  
**C** for Cannister  
**D** for Double Cannister  
**H** for Shell  
**P** for Spherical Case

If you are firing Shell or Spherical Case, you must specify a fuse length. Fuses come in seven lengths, labeled (shortest to longest): **A, B, C, D, E, F, G**. Select one of these by entering the corresponding letter.

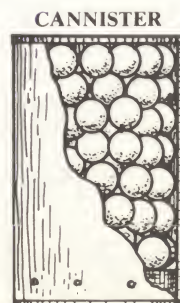
For an historical summary on the different types of ammunition available and an explanation of fuses, see HISTORICAL NOTES.



SPHERICAL CASE



SHELL



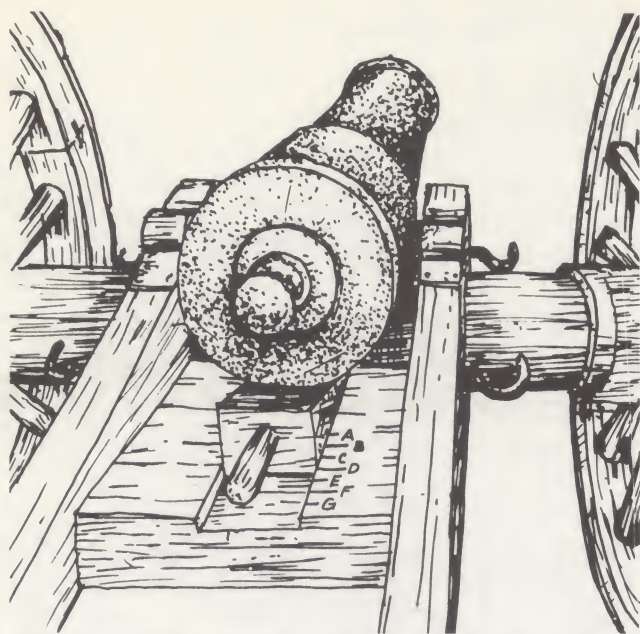
CANNISTER



BALL

## SETTING THE ELEVATION

After choosing your ammunition and fuse length, the computer will ask you to adjust the elevation. Again, this is done by selecting a key **A** (point blank) through **G** (long range).



DETAIL SHOWING QUOIN USED TO ADJUST ELEVATION

## PINPOINTING A TARGET

Once all the above is completed a “+” will appear at the top of the screen to indicate in which direction your cannon is presently pointed. Use the right- and left-pointing caret keys (“>” & “<”) to adjust deflection. Note that the gun will recoil off target after every shot and you will usually have to re-adjust the elevation and deflection.

## FIRING THE CANNON

After you have selected your ammo and fuse length, adjusted the elevation and found a target, the cannon is ready to fire. To fire your gun simply depress the **SPACE BAR**. The above procedure will then start over again and you must start by selecting another round of ammunition.



SPONGE AND RAMMER

## EFFECTS OF SHOTS

- \* When a projectile bursts at the correct range an asterisk will appear at the point of burst causing a number of casualties.
- When the elevation is correct but the fuse goes out or was cut too long the unexploded Shell or Spherical Case will still cause one casualty as it hits the target just like a ball. The “●” marking the projectile will halt at the target as the computer notes the loss, and with infantry the gap will remain in the formation thereafter.
- V- When the elevation is too low the projectile will strike the ground short of the target, making a splash (-V-) and crater (--). It may then bounce on randomly into or over the target or may bury itself.

- @ If the elevation is correct but the fuse too short an “at sign” (@) will appear where the round bursts. This may sometimes seem to be on target but is actually up in the air between you and the target.

When a shot is successful it will eliminate one or more troops from the enemy formation. Every time an enemy gunner is killed the howitzer crew will consider retreating. If they remain in action they will fire more slowly until the missing man is replaced. If a direct hit disables the enemy cannon, its crew will flee.

## INDIVIDUAL SYSTEM DIFFERENCES

### TRS-80

The “at sign” (@) may be used for depressed elevation (*very* short range) and for a shorter fuse setting than **A**.

When aiming the gun the rate of traverse can be made faster by holding down the **F** or **G** key at the same time as the or key.

The TRS-80 has one more important addition. Along with the different types of ammunition supplied (Ball, Shell, Spherical Case and Cannister), you will also be allotted a certain amount of gunpowder which varies from game to game. Each time a shot is fired your gunpowder reserve drops by one. When you have no more gunpowder left, the cannon may no longer be fired.

When a shot digs into the ground near the enemy or passes close overhead, gaps may appear in their formation as soldiers duck and dodge. However, these gaps will close back-up as soon as the shot stops moving, while gaps made by actual hits will remain.

### APPLE

When pinpointing the target you may find the **REPEAT** Key useful as it will speed up traversing the gun.

If two players are taking turns defending the fort, each can enter his own current handicap by asking for the briefing each time it is his turn. Otherwise the computer will carry forward the handicap from the game just ended.

By adjusting the **TINT** control on your TV set you can determine whether the attacking infantry are British (red coats) or American (blue coats) and thus play either side in the War of 1812. (This is also useful for two-sided play, a player defending the fort until it is overrun, then changing the **TINT** for the other player's forces.)

The visible effects of shots are somewhat different from those displayed by other systems.

Bouncing projectiles produce splash marks (- -) or craters as they tear up the grass. Spherical case and shells will burst in a harmless puff of smoke if they bounce over the target, were originally aimed too high or had correct range settings but fuses were set too short. It is usually possible to see whether these bursts are above or behind the target (range error) or in front of it (fuse error). Sometimes, however, this will be obscured by smoke and hard to spot—as it often really was!

Effective hits will cause a visible gap to appear in infantry formations. The infantry will pause to dress ranks whenever this happens and rear-rank file-closers will attempt to fill in the gap if possible. When losses become serious enough to affect their morale, the infantry commander will have his men halt, dress ranks, load and fire a volley. This will give them the satisfaction of hitting

back at you (although they must be very close to you before this is likely to drive away your gunners). More important, it will cover their front with a smoke screen which may throw off your aim for a few shots! The infantry will then resume the advance.

Of course, if you hit them often enough, the infantry will run away, dropping muskets and packs as they scatter!

If attacking infantry get close enough they can fire their muskets between the logs of your palisade and clear out the fort. Thus, they do not have to attack through the gate to defeat you. Attacking cavalry *do* have to charge through the gate, however, having no muskets.

To help you adjust your fire, the Apple will beep whenever your shots at the enemy howitzer are effective. (Players wanting to rough-it without this artificial aid can delete statement number 4372.)

### ATARI 800

The two tunes which are heard during the opening credits are "Liliburlero" and "O'er the Hills and Far Away." The latter was particularly popular during the Napoleonic Wars—in spite of having been written a century earlier. The words, for those inspired to sing along, are (follow the bouncing spherical case):

Hark the drums beat up again,  
For all young soldier gentlemen,  
To come and Enter into pay,  
O'er the hills and far away.

Chorus: O'er the hills and o'er the main  
To Flanders, Portugal and Spain  
Queen Anne commands and we'll obey  
O'er the hills and fa-ar away.

Let all young gentlemen as have a mind,  
To serve a queen that's good and kind,  
Enlist and enter into pay,  
O'er the hills and far away.

(Chorus)

No more from sound of drum retreat,  
While Marlborough and Galway beat,  
The French and Spaniards, every day,  
O'er the hills and far away.

(Chorus)

These tunes are also played by the fifers of the enemy infantry as they advance upon you. As casualties mount you may notice one of them getting out of tune and the cadence becoming increasingly ragged.

### HISTORICAL NOTES

The most common artillery projectile in 1812 was still the classic cannonball of wrought iron. While it had no explosive charge, it could do considerable damage by impact alone. A "spent" ball rolling along at the end of its trajectory could inflict disabling injuries as young soldiers, who tried to catch them for souvenirs, sometimes discovered! While the energy of a 12-pound ball was rather excessive for killing a single soldier, it was very effective for knocking out enemy guns—one hit could crack a gun barrel or shatter the carriage and disable the crew with a hail of deadly splinters.

Cannister has been aptly described as "a paint bucket full of golf balls." On firing, the container of wood or tin was torn open by gas pressure and friction and the 40 to 100 iron balls inside erupted from the muzzle in a deadly spray. These small balls lost velocity quickly, however, and were not effective at longer ranges. Double cannister consisted of loading two cannisters (and one powder charge) into the gun at the same time. This gave twice the number of balls, but the maximum range was so reduced that it was only useful at very close quarters.

Shells were hollow iron spheres filled with gunpowder and fitted with crude time fuses. To avoid the danger of explosion or deterioration in storage, shells were often brought to the battlefield empty and filled with gunpowder (through the fuse hole) just before use. The fuses were wooden tubes packed with fine-grained powder. The length—and thus the burning time—could be roughly set by cutting the fuse off at one of a series of rings marked along its sides. The fuse was then driven firmly into place with a mallet and the shell loaded into the howitzer. In spite of the lower rate of fire caused by all these steps and the unreliability of the fuses, shell was favored for certain targets—cavalry in particular, as the bursting shells tended to frighten their horses.

Spherical Case Shot was a thin-walled spherical "shell" with the usual fuse, but where a shell was nearly filled with powder, the Spherical Case was filled with lead musket balls and only a small powder charge. Its fuse was set to burst not among the enemy troops as with shell, but 50 to 100 yards before reaching them. The powder charge was just adequate to tear open the outer shell without scattering the balls too widely. They, in turn, would form a cloud that would continue along the original trajectory until they collided with the target. The net effect was similar to a charge of cannister fired from the bursting point. For all its complexity and expense, Spherical Case could be highly effective and was widely copied at the end of the Napoleonic Wars.

The gunpowder used to fire the guns and howitzers was contained in cartridge bags of serge, as this material burned cleanly and not too much would be left behind to clog up the bore. Although careful adjustment of powder charges was sometimes done in siege warfare, in the field one normally used one size of charge for each gun or howitzer and adjusted the range by varying the elevation. The strength of the gunpowder varied widely due to the methods (and honesty) of the manufacturers, rough handling, and exposure to dampness. Wise gunners (then as now) kept all cartridges received in each shipment together. This minimized the variation between one shot and the next. Likewise, fuses were not very reliable. Even when properly cut for the range and elevation, they were likely to go out or go off too early! Thus, the opening range settings in the game will vary considerably from one attack to the next.

Pictured on the box cover is a gun of the type which would have been found at a remote outpost like Ft. Defiance. It weighs nearly 4500 pounds (with carriage) which was about the limit for cross-country, horse-drawn movement.

The gun was designed to fire ball and had a long barrel to obtain the highest possible velocity (and thus energy) with a reasonable-sized shot. Given the weight limits and 1800 technology, this was a barrel about seven feet long, weighing 2000 pounds and firing a 12 pound shot, the size of a grapefruit.

Early attempts to fire shell from guns failed because the shells were broken by the strain of pushing them to high velocities. Since high velocities were undesirable, the weight of the barrel could be better used to make it short and of larger diameter, to throw a large shell at low velocities. Thus the howitzer was developed as a companion to the twelve-pounder gun. A howitzer frequently had a barrel three feet long and could fire a forty-pound shell. The low velocity of the shell gave it a shorter maximum range, but when fired at high elevations it dropped almost straight down at the end of its flight. This made it very useful against troops behind cover (such as the walls of a half-finished fort).

Either of these weapons could fire cannister. While the howitzer cannister was heavier than that of the gun, it contained roughly the same number of balls, their individually greater weight off-setting their lower initial velocity to make them deadly.

When Spherical Case was developed, better manufacturing techniques made it possible to fire it from guns (as well as howitzers) without breaking it up. By the mid-19th century (after our game is set) guns were firing shell as well, and the howitzer was a vanishing species.

## ROLLING FIRE

Because of their spherical shape the projectiles of smoothbore artillery tended to bound on impact with the ground rather than burying themselves as would a modern, pointed shell. When fired at low angles of elevation it was theoretically possible for a ball to bounce along for hundreds of yards before rolling to a halt. Given a solid rank of troops for a target this would seem to make hits virtually certain with every shot. However, in reality, the ground was never perfectly flat and even small irregularities could cause shots to skip over their intended victims. Nevertheless, against cavalry and infantry it was accepted practice to aim low and employ this "rolling fire."

Shell and Spherical Case could also be used in rolling fire, but the concussion of repeated impacts made the fuses even less reliable than usual. Of course, a dud Shell Spherical Case shot could be just as deadly as a Ball!

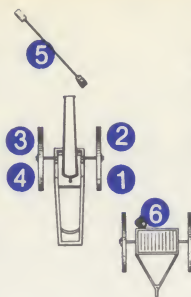
## STEP BY STEP PROCEDURE

Loading and firing these weapons was a complicated task, which required close coordination by all of the members of the crew. Gunners normally spent hours of every day running through the steps of gun drill. This paid dividends, however, for a well-trained crew could load and fire their piece twelve or more times per minute—although two shots per minute was a more common rate in combat, where conditions were less ideal than on the parade ground.

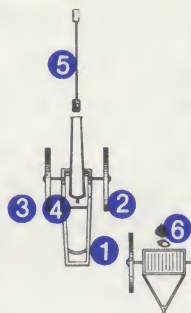
Each man had his particular task to perform. For convenience, we have numbered the men in the diagrams below.



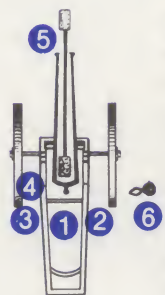
**First Step**—(The gun having just fired and recoiled) while men 1,2,3 and 4 "run up" the gun, pushing it back into firing position and number 5 dips the sponge of his rammer in a bucket of water, number 6 selects a Spherical Case for the next shot, and prepares to cut fuse.



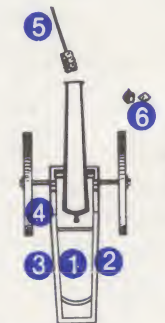
**Second Step**—Numbers 1 to 4 finish running up gun. 5 steps up to muzzle. 6 cuts and drives fuse into Spherical Case, puts it into his ammo pouch.



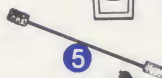
**Third Step**—Numbers 1,2 and 3 walk towards the rear. Number 4 steps between left wheel and breech of gun. Number 5 levels rammer with sponge-end in muzzle of gun. 6 takes powder charge from chest on ammo wagon.



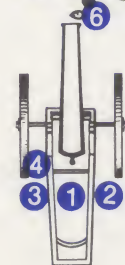
**Fourth Step**—Number 1 steps between the trails of the gun, as 2 and 3 step up to either side of the breech. Number 5 pushes the wet sponge-end of the rammer all the way into the gun, drowning any sparks left from the previous shot, while 4 plugs the touch-hole of the gun with his thumb to prevent any sparks from being blown up it, out of reach of the sponge. 6 runs forward with ammo.



**Fifth Step**—Number 5 withdraws rammer and 4 removes thumb. Numbers 2 and 3 lift breech while number 1 adjusts elevating quoin.



**Sixth Step**—Number 5 reverses rammer, so wet end will not touch cartridge. Number 6 arrives at muzzle with ammo.



**Seventh Step**—Number 6 places cartridge in muzzle and 5 rams it all the way down the barrel. Numbers 1,2 and 3 step to the rear of the gun cartridge.

Now press the 'PLAY' button on the cassette recorder and then hit 'RETURN'. After a slight pause the APPLE will beep once and return an error message or continue to load, as in loading the "Shape Table". The APPLE is more critical about volume adjustment on the "Program" load than on the "Shape Table" SHLOAD, so you may have to make yet another volume adjustment before the program loads. However, only a very small change will be needed (if any) as the "Shape Table" and "Program" were both recorded in one run with the same input volume and both should load at the same volume.

When the "Program" is finished loading the APPLE will beep again . . . and the cursor will reappear. Type 'RUN' and press 'ENTER' to start the program. Once you have determined the correct volume setting needed for loading the "Program" you can considerably simplify the loading process on future runs by doing the following:

HIMEM: 48\*1024 (RETURN)  
NEW (RETURN)

POKE 103,01: POKE 104,96: POKE 24576,1: POKE 1005,0: POKE 1006,2:

SHLOAD: LOAD (do not 'RETURN')

Now press 'PLAY' on the recorder, then hit the 'RETURN' key on your APPLE.

If the volume is set correctly, the 'Shape Table' and "Program" will load without you stopping to re-cue the cassette between them. The APPLE will beep four times during the process.

The APPLE is very sensitive to radio "static" that it may pick up while listening to the silence between the "Shape Table" and the "Program" and may decide not to load the latter if it picks up any stray signals.

## COMMODORE PET 2001

Turn the tape over so SIDE TWO is up. Insert the tape in your recorder and rewind to the beginning of the tape. When ready, type:

### LOAD

and press the 'RETURN' button on the keyboard, then the 'PLAY' button on the recorder. The tape should start moving, and start loading your program. This program is not short, and will take several minutes to load. The computer will tell you when it finds the program and starts loading. When done, the computer will print 'READY', and the tape will stop. Type:

### RUN

and press 'RETURN' to play the game.

## TRS-80

The TRS-80 program is located on SIDE TWO after the PET 2001 program. By pulling out the EAR and MIC jacks on the recorder and listening to the tape, you can differentiate the PET program from the TRS-80 program. The PET sounds louder, yet has a lower pitch.

Check that the volume control is set to the proper level (between 5 and 6 is normal). Press 'PLAY' on the recorder, type:

### CLOAD

(For Mod III only, enter: L after CASS?, then CLOAD)

and press the 'ENTER' key on the keyboard. The recorder should start to move and your program will be loaded. This will be indicated by the flashing asterisk at the upper right corner of the screen. This program is not short, and will take several minutes to load. When the tape stops and the TRS-80 prints 'READY' on the screen, type:

### RUN

and press 'ENTER' to play the game.

## DISKETTE LOADING INSTRUCTIONS

### APPLE II DISKETTE

Insert diskette and "boot" the system.

### TRS-80 DISKETTE

Insert diskette and "boot" the system. Model III owners must first convert the program to run on their machine per the enclosed instruction sheet.

## DESIGN CREDITS:

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**Typesetting:** Colonial Composition

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## QUESTIONS ON PLAY

The clarity of these rules has been verified by *Software Testers of Universal Microcomputer Programmers (STUMP)* and deemed "complete" in all facets of instruction. Please re-read them in areas that seem unclear at first reading. Questions on play can be answered by the factory *only* upon receipt of a self-addressed envelope bearing first-class postage.

## IF YOU CANNOT LOAD THE PROGRAM

1. Check your equipment carefully to be sure that all cables and connections are correct.
2. Re-read the section in your computer's manual that tells you how to load software. Try to load software again.
3. If you can adjust the volume on your recorder, try different settings, both higher and lower.
4. If possible, load another program from a tape or disk you know works on your computer. This will prove that your equipment works. Try once more to load your game.
5. The normal reason software will not load is tape recorder or disk drive head misalignment. Your computer may be able to save and load programs on its own recorder, but be unable to read software made on a different recorder for this reason. Be sure your recorder heads are correctly aligned. Your local computer store or dealer can help you with this.
6. If the program still cannot be loaded, send the software, with a complete description of the problem (what type of computer you have, what the computer says, if anything, when you try to load the software or play the game, and what you did to try to get it to load.) to:

## Avalon Hill Microcomputer Games

4517 Harford Road

Baltimore, Maryland 21214

Defective software will be replaced.

## After the program is loaded

Once you have your program loaded, it is a good idea to make a backup copy (for your own use). Follow the normal procedure for saving a program in your computer's manual.

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## CASSETTE LOADING INSTRUCTIONS

### ATARI

Lift the cartridge door on your ATARI computer and insert the COMPUTING LANGUAGE BASIC cartridge into the computer.

Press the POWER switch ON. With SIDE ONE of the cassette up, put it into your ATARI CASSETTE RECORDER and press 'RE-WIND' until the tape stops moving. Using the keyboard, type:

### CLOAD

Then press the 'RETURN' key on the keyboard. You will hear one beep. Push 'PLAY' on the recorder and press 'RETURN' again. The recorder should start to move and the program will be loaded. By turning up the volume on your video screen you can hear the program being loaded. When the tape stops, the program has been transferred from the cassette tape to the computer. 'READY' will be displayed on the screen. Type:

### RUN

and press the 'RETURN' key to play the game. Should your video screen display the word ERROR, press the 'RESET' button and repeat all of the above loading instructions.

To assure a successful load on your ATARI computer we suggest you advance the clear portion of tape (leader) until the brown magnetic portion is just visible to the left of the cassette head.

### APPLE II

The APPLE program is located on SIDE ONE after the ATARI program. By listening to the tape, you can tell the difference between the two programs. The APPLE program is easily recognized by the relatively high pitch and 'pure' quality of the calibration tone at the beginning of the program. This tone is free of the characteristic ATARI buzz. Find the beginning of the APPLE program and position the tape to just after the start of the calibration tone.

"Bring up" Floating Point BASIC (not Integer BASIC) on your computer. (How this is done will depend on which model of APPLE you own. With an APPLE II PLUS you just turn it on, while older APPLES may require a special APPLESOFT cassette to be loaded. See your owners manual.)

Volume levels for individual recorders and computers can vary widely and the APPLE is very critical of incorrect volume settings, so you may have to try a number of settings before the correct one is discovered. (See your owners manual for instructions on cassette volume adjustment.)

With the recorder output jack unplugged, play the tape just into the beginning of the calibration whistle at the start of the program and stop. Now plug in the connector cable from the computer to the recorder. Type in the following commands (These serve to locate incoming program in specific areas of memory to avoid overlap with the high resolution graphics):

|                |          |
|----------------|----------|
| HIMEM: 48*1024 | (RETURN) |
| NEW            | (RETURN) |
| POKE 103,01    | (RETURN) |
| POKE 104,96    | (RETURN) |
| POKE 24576,0   | (RETURN) |
| POKE 1005,0    | (RETURN) |
| *POKE 1006,2   | (RETURN) |

\*Those persons with cassette APPLESOFT use **POKE 1006,0** instead of **POKE 1006,2**.

The "Shape Table" used with the high resolution graphics is now loaded from the tape by the following method: Type

### SHLOAD (do not 'RETURN' yet)

Now press 'PLAY' on the recorder and hit 'RETURN' on the keyboard. After a short pause the APPLE will beep once. If the volume setting is wrong an error message will appear. See your owners manual for hints on volume adjustment. If the volume setting is correct the "Shape Table" will finish loading, the APPLE will beep again and the cursor will reappear.

The "Program" is now ready to be loaded by the following method: Disconnect the cable from the recorder output and cue-up the cassette at the start of the calibration whistle for the "Program" as described above, then reconnect the cable from the computer. Next, type:

### LOAD (do not 'RETURN')

**Eighth Step**—Number 5 withdraws rammer and 4 drives a sharp-pointed priming wire down the touch-hole and into the cartridge, tearing it open.

**Ninth Step**—Number 6 places Spherical Case shot in muzzle and helps number 5 to ram it home onto the cartridge, which splits further open. Number 4 removes priming wire.

**Tenth Step**—Number 5 withdraws rammer and 6 starts back to ammo wagon. Number 4 pours loose powder into touch-hole (or puts a special fuse into it). Numbers 2 and 3 pick up trail of gun.

**Eleventh Step**—Number 5 starts back to his bucket, number 4 steps away from the gun. Number 1 sights along the barrel and tells 2 and 3 to traverse the gun left or right.

**Twelfth Step**—Numbers 1,2 and 3 step away from the gun to each side. Number 2 picks up his linstock (left here since gun was last fired) and blows on the smoldering match (clipped to one end) until it glows.

**Thirteenth Step**—Standing with his back to the enemy (so he can see that everyone else is in the clear) number 2 touches the glowing match to the powder piled in the touch-hole. This inflames and sets off the charge, which fires the Spherical Case toward the enemy and throws the gun backward about six feet. As the smoke cloud billows around your crew, you observe the projectile bouncing toward the enemy . . . number 2 sticks one end of his linstock in the ground and the cycle begins again.